

Amendments to the Claims

Please cancel Claims 1-24. Please add new Claims 25-51. The Claim Listing below will replace all prior versions of the claims in the application:

Claim Listing

1-24 Cancelled

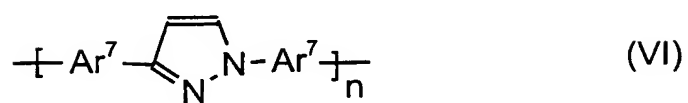
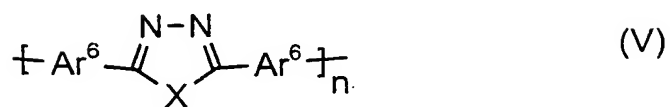
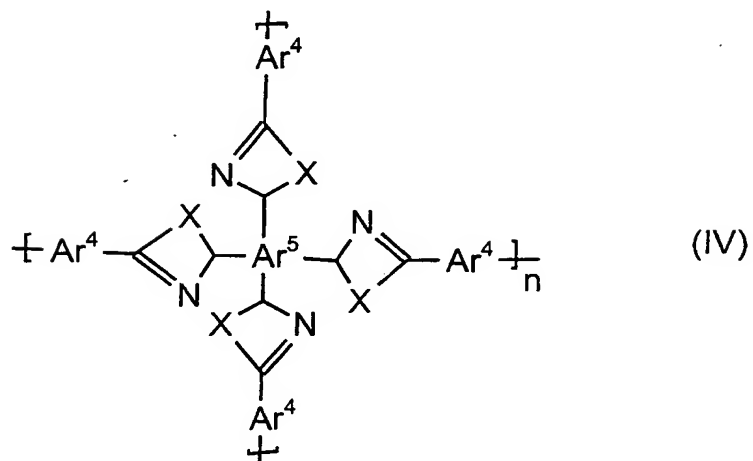
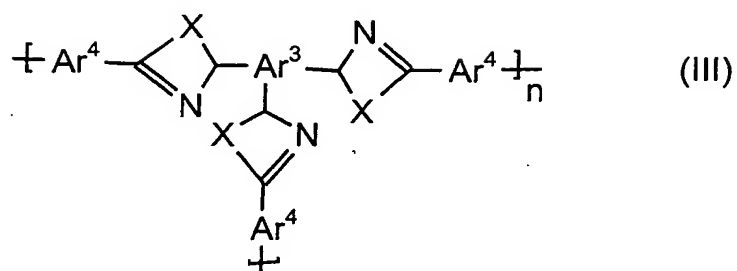
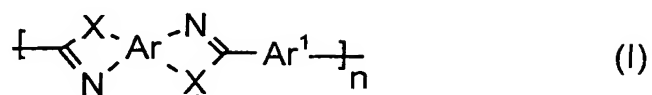
25. (New) A polymer film based on polyazoles which is obtained by a process comprising the steps
- A) mixing one or more aromatic tetraamino compounds with one or more aromatic carboxylic acids or esters thereof which contain at least two acid groups per carboxylic acid monomer, or mixing of one or more aromatic or heteroaromatic diaminocarboxylic acids, in polyphosphoric acid to form a solution or dispersion,
 - B) applying a layer using the mixture from step A) to a support,
 - C) heating the layer obtained according to step B) under inert gas at temperatures of up to 350°C to form a polyazole polymer,
 - D) treating the polymer film formed in step C) until it is self-supporting,
 - E) detaching the polymer film formed in step D) from the support,
 - F) removing the polyphosphoric acid or phosphoric acid present and drying.
26. (New) The polymer film of Claim 25, wherein the aromatic tetraamino compounds are selected from the group consisting of 3,3',4,4'-tetraaminobiphenyl, 2,3,5,6-tetraaminopyridine, 1,2,4,5-tetraaminobenzene, bis(3,4-diaminophenyl) sulfone, bis(3,4-diaminophenyl) ether, 3,3',4,4'-tetraaminobenzophenone, 3,3',4,4'-tetraaminodiphenylmethane, and 3,3',4,4'-tetraaminodiphenyldimethylmethane.
27. (New) The polymer film of Claim 25, wherein the aromatic dicarboxylic acids are selected from the group consisting of isophthalic acid, terephthalic acid, phthalic acid, 5-hydroxyisophthalic acid, 4-hydroxyisophthalic acid, 2-hydroxyterephthalic acid, 5-

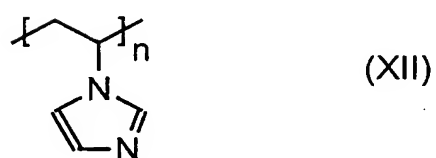
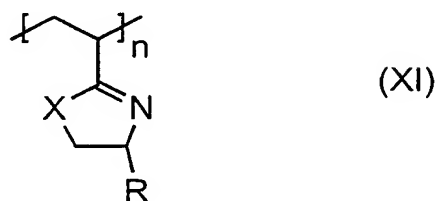
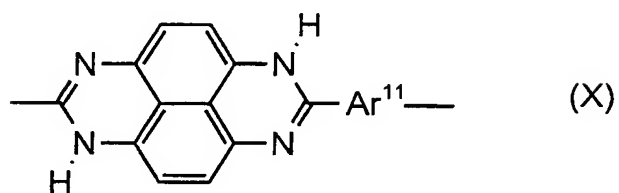
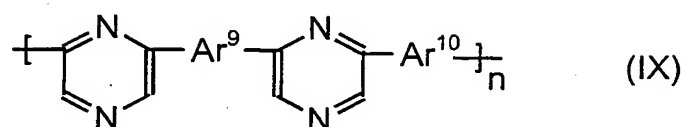
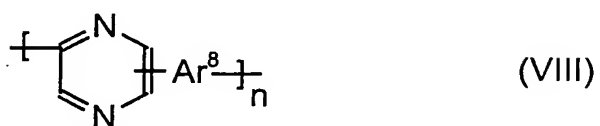
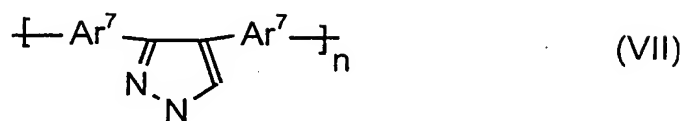
aminoisophthalic acid, 5-N,N-dimethylaminoisophthalic acid, 5-N,N-diethylaminoisophthalic acid, 2,5-dihydroxyterephthalic acid, 2,5-dihydroxyisophthalic acid, 2,3-dihydroxyisophthalic acid, 2,3-dihydroxyphthalic acid, 2,4-dihydroxyphthalic acid, 3,4-dihydroxyphthalic acid, 3-fluorophthalic acid, 5-fluoroisophthalic acid, 2-fluoroterephthalic acid, tetrafluorophthalic acid, tetrafluoroisophthalic acid, tetrafluoroterephthalic acid, 1,4-naphthalenedicarboxylic acid, 1,5-naphthalenedicarboxylic acid, 2,6-naphthalenedicarboxylic acid, 2,7-naphthalenedicarboxylic acid, diphenic acid, 1,8-dihydroxynaphthalene-3,6-dicarboxylic acid, bis(4-carboxyphenyl) ether, benzophenone-4,4'-dicarboxylic acid, bis(4-carboxyphenyl) sulfone, biphenyl-4,4'-dicarboxylic acid, 4-trifluoromethylphthalic acid, 2,2-bis(4-carboxyphenyl)hexafluoropropane, 4,4'-stilbenedicarboxylic acid, 4-carboxycinnamic acid, their C1-C20-alkyl esters, their C5-C12-aryl esters, their acid anhydrides, and their acid chlorides.

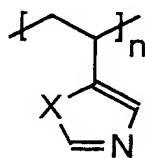
28. (New) The polymer film of Claim 25, wherein the aromatic carboxylic acids are selected from the group consisting of tricarboxylic acids, tetracarboxylic acids, their C1-C20-alkyl esters, their C5-C12-aryl esters, their acid anhydrides, and their acid chlorides.
29. (New) The polymer film of Claim 28, wherein the aromatic carboxylic acids are selected from the group consisting of 1,3,5-benzenetricarboxylic acid (trimesic acid); 1,2,4-benzenetricarboxylic acid (trimellitic acid); (2-carboxyphenyl)iminodiacetic acid; 3,5,3'-biphenyltricarboxylic acid; 3,5,4'-biphenyltricarboxylic acid; and 2,4,6-pyridinetricarboxylic acid.
30. (New) The polymer film of Claim 25, wherein the aromatic carboxylic acids are selected from the group consisting of tetracarboxylic acids, their C1-C20-alkyl esters, their C5-C12-aryl esters, their acid anhydrides, and their acid chlorides.
31. (New) The polymer film of Claim 30, wherein the aromatic carboxylic acids are selected from the group consisting of benzene-1,2,4,5-tetracarboxylic acid, naphthalene-1,4,5,8-tetracarboxylic acid, 3,5,3',5'-biphenyltetracarboxylic acid;

benzophenonetetracarboxylic acid, 3,3',4,4'-biphenyltetracarboxylic acid, 2,2',3,3'-biphenyltetracarboxylic acid, 1,2,5,6-naphthalenetetracarboxylic acid, and 1,4,5,8-naphthalenetetracarboxylic acid.

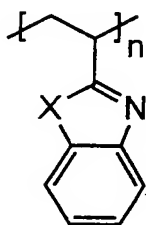
32. (New) The polymer film of Claim 28, wherein the content of tricarboxylic acids and tetracarboxylic acids (based on dicarboxylic acid used) is from 0 to 30 mol%.
33. (New) The polymer film of Claim 25, wherein the heteroaromatic carboxylic acids used are heteroaromatic dicarboxylic acids and tricarboxylic acids and tetracarboxylic acids in which at least one nitrogen, oxygen, sulfur or phosphorus atom is present in the aromatic.
34. (New) The polymer film of Claim 33, wherein the heteroaromatic carboxylic acids used are selected from the group consisting of pyridine-2,5-dicarboxylic acid, pyridine-3,5-dicarboxylic acid, pyridine-2,6-dicarboxylic acid, pyridine-2,4-dicarboxylic acid, 4-phenyl-2,5-pyridinedicarboxylic acid, 3,5-pyrazoledicarboxylic acid, 2,6-pyrimidinedicarboxylic acid, 2,5-pyrazinedicarboxylic acid, 2,4,6-pyridinetricarboxylic acid, benzimidazole-5,6-dicarboxylic acid, their C1-C20-alkyl esters, their C5-C12-aryl esters, their acid anhydrides, and their acid chlorides.
35. (New) The polymer film of Claim 25, wherein a polyphosphoric acid having an assay calculated as P_2O_5 (acidimetric) of at least 83% is used in step A).
36. (New) The polymer film of Claim 25, wherein a solution or a dispersion/suspension is produced in step A).
37. (New) The polymer film of Claim 25, wherein a polyazole-based polymer comprising recurring azole units of one or more of the general formula (I), (II), (III), (IV), (V), (VI), (VII), (VIII), (IX), (X), (XI), (XII), (XIII), (XIV), (XV), (XVI), (XVII), (XVIII), (XIX), (XX), (XXI), or (XXII):



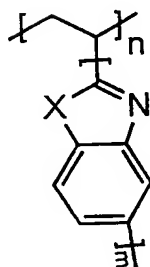




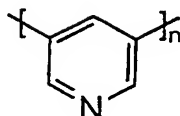
(XIII)



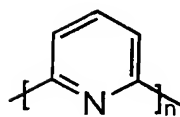
(XIV)



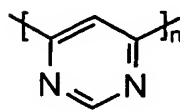
(XV)



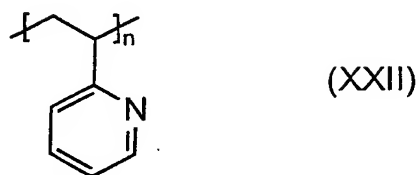
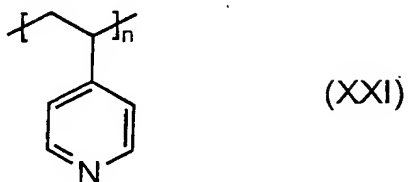
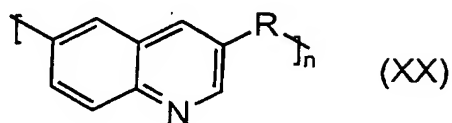
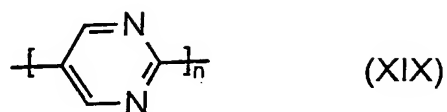
(XVI)



(XVII)



(XVIII)



where

the radicals Ar

are identical or different and are each a tetravalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,

the radicals Ar¹

are identical or different and are each a divalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,

the radicals Ar²

are identical or different and are each a divalent or trivalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,

the radicals Ar³

are identical or different and are each a trivalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,

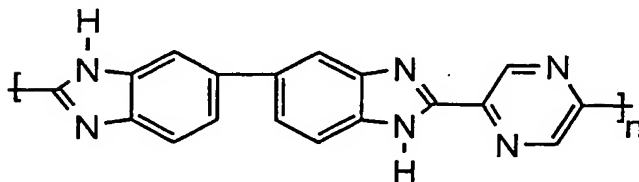
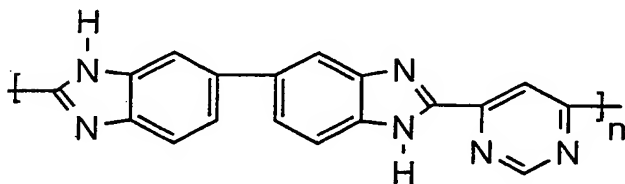
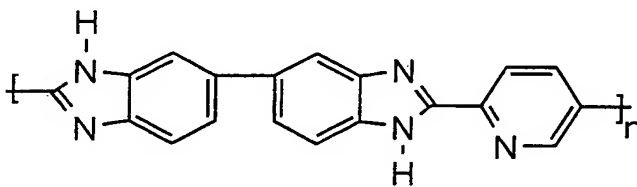
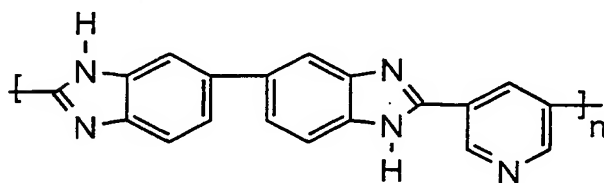
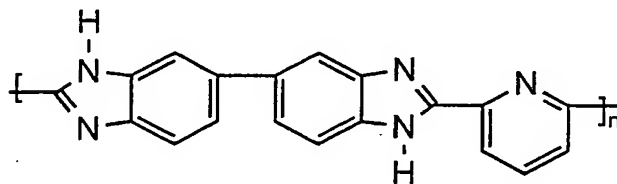
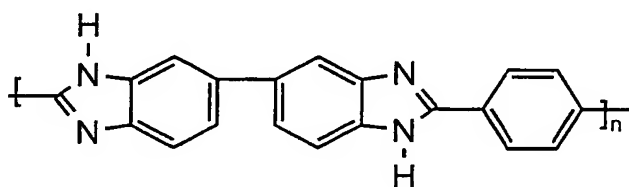
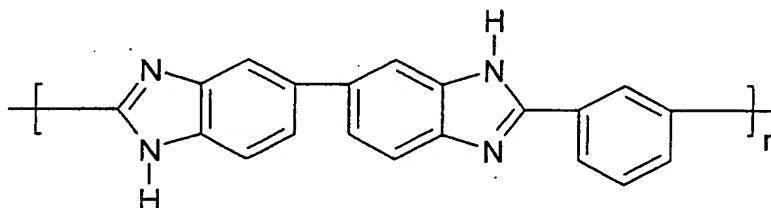
the radicals Ar⁴

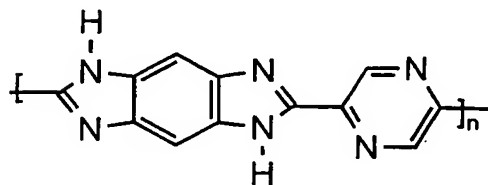
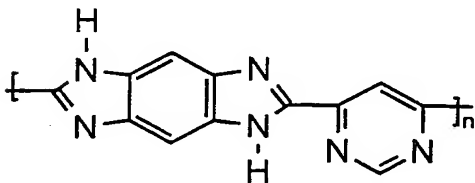
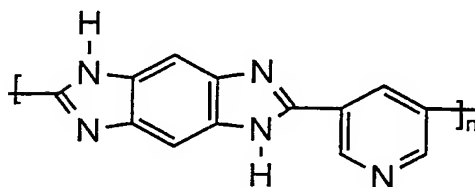
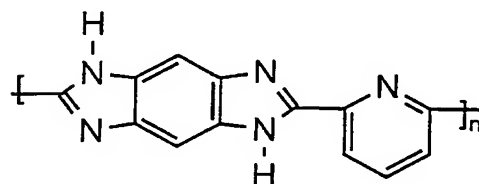
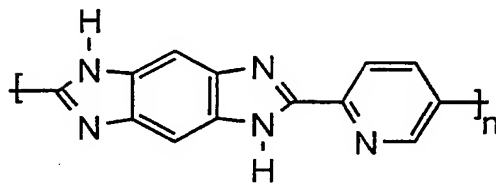
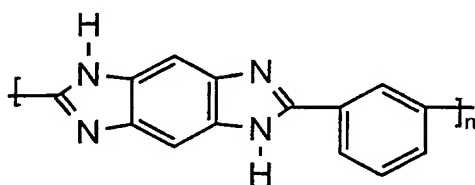
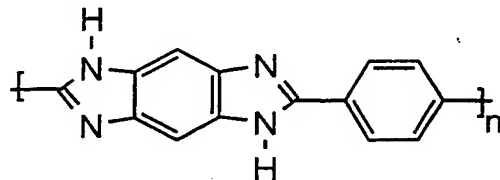
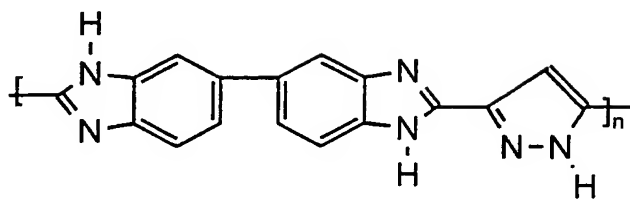
are identical or different and are each a trivalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,

the radicals Ar⁵ are identical or different and are each a tetravalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
 the radicals Ar⁶ are identical or different and are each a divalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
 the radicals Ar⁷ are identical or different and are each a divalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
 the radicals Ar⁸ are identical or different and are each a trivalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
 the radicals Ar⁹ are identical or different and are each a divalent or trivalent or tetravalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
 the radicals Ar¹⁰ are identical or different and are each a divalent or trivalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
 the radicals Ar¹¹ are identical or different and are each a divalent aromatic or heteroaromatic group which can be monocyclic or polycyclic,
 the radicals X are identical or different and are each oxygen, sulfur or an amino group which bears a hydrogen atom, a group having 1-20 carbon atoms, or an aryl group as further radical,
 the radicals R are identical or different and are each hydrogen, an alkyl group or an aromatic group, with the proviso that R in the formula (XX) is not hydrogen, and
 n, m are each an integer greater than or equal to 10,
 is formed in step C).

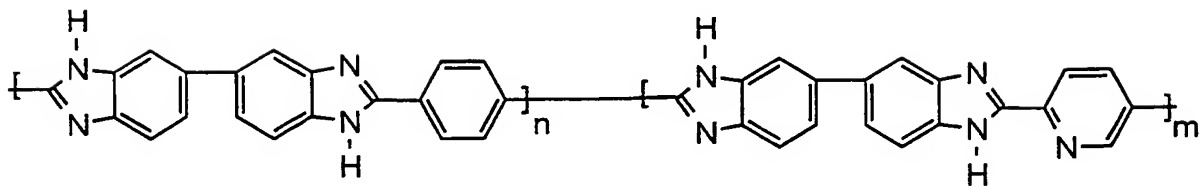
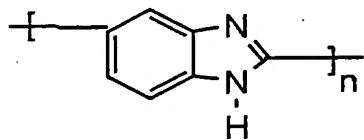
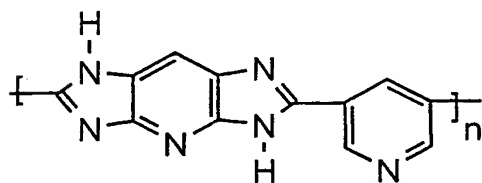
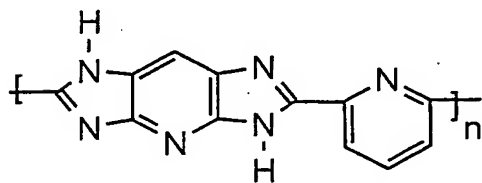
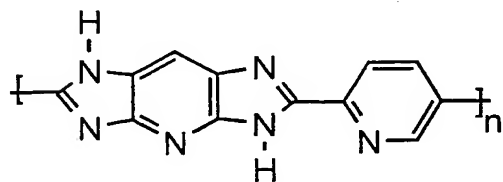
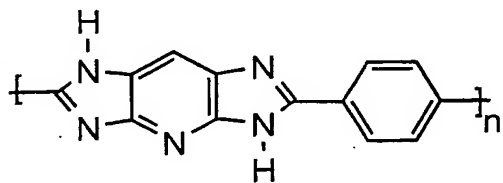
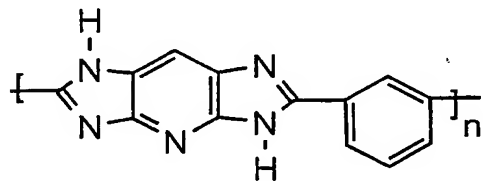
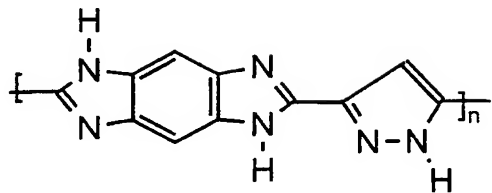
38. (New) The polymer film of Claim 25, wherein a polymer selected from the group consisting of polybenzimidazole, poly(pyridines), poly(pyrimidines), polyimidazoles, polybenzothiazoles, polybenzoxazoles, polyoxadiazoles, polyquinoxalines, polythiadiazoles, and poly(tetrazapyrenes) is formed in step C).

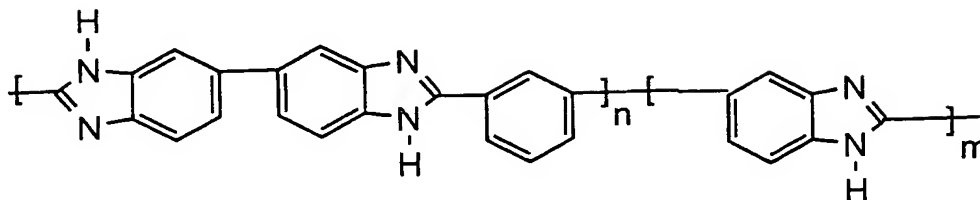
39. (New) The polymer film of Claim 25, wherein a polymer comprising recurring benzimidazole units of the formula





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where n and m are each an integer greater than or equal to 10 is formed in step C).

40. (New) The polymer film of Claim 25, further including a step of adjusting the viscosity by addition of phosphoric acid after step A) and before step B).
41. (New) The polymer film of Claim 25, wherein the membrane produced according to step C) is treated in the presence of moisture at temperatures and for a time sufficient for the membrane to be self-supporting and to be able to be detached from the support without damage.
42. (New) The polymer film of Claim 25, wherein the treatment of the membrane in step D) is carried out at temperatures of from greater than 0°C to 150°C in the presence of moisture.
43. (New) The polymer film of Claim 25, wherein the treatment of the membrane in step D) is carried out for from 10 seconds to 300 hours.
44. (New) The polymer film of Claim 25, wherein the removal of the polyphosphoric acid or the phosphoric acid in step F) is carried out by means of a treatment liquid.
45. (New) The polymer film of Claim 25, wherein the treatment in step D) is omitted.
46. (New) The polymer film of Claim 25, wherein the polymer film is not self-supporting after the treatment in step D) and remains on the support for further processing.
47. (New) A polymer based on polyazoles as defined in Claim 37 whose molecular weight expressed as intrinsic viscosity is at least 1.4 dl/g and which is obtained by a process comprising the steps

- A) mixing one or more aromatic tetraamino compounds with one or more aromatic carboxylic acids or esters thereof which contain at least two acid groups per carboxylic acid monomer, or mixing of one or more aromatic or heteroaromatic diaminocarboxylic acids, in polyphosphoric acid to form a solution or dispersion,
 - B) heating the mixture obtained according to step A) under inert gas at temperatures of up to 350°C to form the polyazole polymer,
 - C) precipitating the polymer formed in step B), isolation and drying of the polymer powder obtained.
48. (New) A polymer fiber based on a polyazoles of Claim 37 whose molecular weight expressed as intrinsic viscosity is at least 1.4 dl/g and which is obtained by a process comprising the steps
- A) mixing one or more aromatic tetraamino compounds with one or more aromatic carboxylic acids or esters thereof which contain at least two acid groups per carboxylic acid monomer, or mixing of one or more aromatic or heteroaromatic diaminocarboxylic acids, in polyphosphoric acid to form a solution or dispersion,
 - B) heating the mixture from step A) at temperatures of up to 350°C to form the polyazole polymer,
 - C) extruding the polyazole polymer formed in step B) to form fibers,
 - D) introducing the fibers formed in step C) into a bath of liquid,
 - E) isolating and drying of the fibers obtained.
49. (New) The polymer fiber of Claim 48, wherein the fibers formed in step C) are introduced into a precipitation bath.
50. (New) The polymer fiber of Claim 48, wherein the polyazole polymer extruded in step C) is saturated with a gas so that the gas forms pores on subsequent expansion.

51. (New) The polymer fiber of Claim 48, wherein the polyazole polymer extruded in step C) is saturated with a gas in a supercritical state so that the gas forms pores on subsequent expansion.